[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[NRC-2017-0168]

Draft Test Plan High Energy Arcing Faults Phase 2

AGENCY: Nuclear Regulatory Commission.

ACTION: Draft test plan; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is requesting public comment on the draft test plan entitled, “High Energy Arcing Faults (HEAFs) in Electrical Equipment Phase 2,” in order to receive feedback from the widest range of interested parties and to ensure that all information relevant to developing this document is available to the NRC staff.

DATES: Submit comments by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN *FEDERAL REGISTER*]**. Comments received after this date will be considered if it is practical to do so, but the Commission is able to ensure consideration only for comments received on or before this date.

ADDRESSES: You may submit comments by any of the following methods:

- **Federal Rulemaking Web Site:** Go to http://www.regulations.gov and search for Docket ID **NRC-2017-0168**. Address questions about NRC dockets to Carol Gallagher; telephone: 301-415-3463; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **Mail comments to:** Cindy Bladey, Office of Administration, Mail Stop: TWFN-8-D36M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

For additional direction on obtaining information and submitting comments, see "Obtaining Information and Submitting Comments" in the SUPPLEMENTARY INFORMATION section of this document.

FOR FURTHER INFORMATION CONTACT: Nicholas Melly, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-2392; e-mail: Nicholas.Melly@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Obtaining Information and Submitting Comments

A. Obtaining Information

Please refer to Docket ID **NRC-2017-0168** when contacting the NRC about the availability of information for this action. You may obtain publicly-available information related to this action by any of the following methods:

- **Federal Rulemaking Web Site:** Go to http://www.regulations.gov and search for Docket ID **NRC-2017-0168**.
- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly-available documents online in the ADAMS Public Documents collection at http://www.nrc.gov/reading-rm/adams.html. To begin the search, select "ADAMS Public Documents" and then select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209,

301-415-4737, or by e-mail to pdr.resource@nrc.gov. The draft test plan, "High Energy Arcing Faults (HEAFs) in Electrical Equipment Phase 2," is available in ADAMS under Accession No. **ML17201Q551**.

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

B. Submitting Comments

Please include Docket ID **NRC-2017-0168** in the subject line of your comment submission.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC posts all comment submissions at http://www.regulations.gov as well as entering the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment submissions to remove such information before making the comment submissions available to the public or entering the comment submissions into ADAMS.

II. Discussion

The purpose of this test program is to better understand the fire risk presented by high energy arc fault phenomena and to characterize physical parameters such as the thermal conditions, pressure effects, and electrical conductive products of combustion created by

HEAFs occurring primarily in electrical cabinets and bus ducts. The experimental data will be used by the NRC to determine the adequacy of existing HEAF zone of influences (ZOIs) damage models and support revisions to those methods if necessary. Additionally, phase 2 of testing will focus on the HEAFs involving aluminum components as it pertains to both increased physical damage states and potential product of combustion electrical conductivity concerns. This research is also being proposed as an international nuclear safety research project.

Currently, there are two available methods to model HEAF damage. Electrical enclosure guidance is contained in NUREG/CR-6850 (EPRI 1011989), "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities Volume 2: Detailed Methodology," Appendix M (ADAMS Accession No. ML15167A411). This model is limited because it was largely derived from empirical evidence from one single well-documented HEAF event that occurred at the San Onofre Nuclear Generating Station, Unit 3, on February 3, 2001. A second method that focuses on damage involving bus duct HEAF events can be found in NUREG/CR-6850 (EPRI 1019259) Supplement 1, "Fire Probabilistic Risk Assessment Methods Enhancements", Section 7 "Bus Duct (Counting) Guidance for High-Energy Arcing Faults (FAQ 07-0035)" (ADAMS Accession No. ML15167A550).

Both methods employ a "one size fits all" ZOI methodology that prescribes a damage zone around an initiating component. These ZOIs prescribe damage to potentially vulnerable electrical or electromechanical components nearby such as cables, transformers, ventilation fans, other cabinets, etc. The international Organization for Economic Co-operation and Development (OECD)/Nuclear Energy Agency (NEA) experimental HEAF Project was created in an attempt to take an exploratory scientific approach to better understand the HEAF phenomena and produce data that could be used to better inform fire modeling techniques for postulating a realistic damage range of HEAF scenarios. The report can be downloaded here: https://www.oecd-nea.org/nsd/docs/2017/csni-r2017-7.pdf.

This draft test plan describes the NRC's next phase of testing necessary to better understand the HEAF phenomena and to characterize the damage involving thermal conditions, pressure effects, and electrically conductive deposits on nearby surfaces created by HEAFs occurring in electrical cabinets and bus ducts. The results of this program will provide qualitative information on the impact of HEAFs on typical fire probabilistic risk assessment targets such as electrical cable and nearby equipment. The experimental data will be used by the NRC to determine the adequacy of existing HEAF ZOIs presented in NUREG/CR-6850, Appendix M and Supplement 1 and to adjust existing methodology as necessary. The phase 2 testing will also focus on the HEAF involving aluminum components as it pertains to both increased physical damage states and electrical conductive products of combustion concerns. This test program is also being proposed internationally through the OECD and the NEA as a collaborative international nuclear safety research program.

This document is not intended for interim use. The NRC will review public comments received on the document, incorporate suggested changes as appropriate, and make the final test plan available. Consistent with past experimental programs, the final test plan will be considered a living document.

Changes to the final test plan can, and likely will be made during the testing phase as insights and observations from the testing develop that would suggest changes are necessary to ensure valuable data from experiments is being obtained.

Dated at Rockville, Maryland, this 27th day of July, 2017.

For the Nuclear Regulatory Commission.

Mark Henry Salley, Chief,
Fire and External Hazard Analysis Branch,
Division of Risk Analysis,
Office of Nuclear Regulatory Research.

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